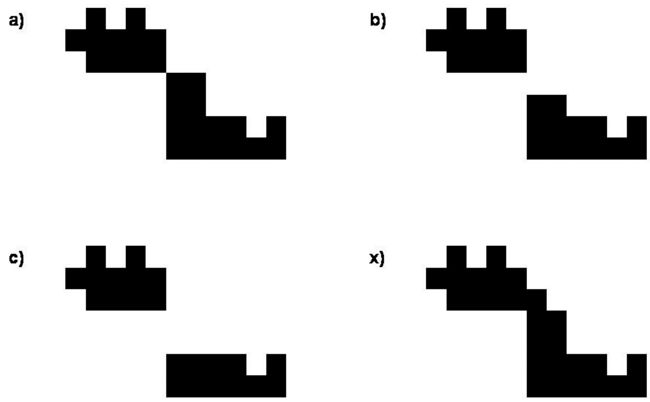
Ecography

E4954

Romdal, T. S. and Grytnes, J.-A. 2007. An indirect area effect on elevational species richness patterns. – Ecography 30: 440–448.

Appendix 1. Simple representation of the criteria for contiguity of forest units, i.e. the degree of contact needed for acceptance of cohesion of 500 × 500 m gridcells. In all examples, the forest areas shown meet the criterion for being accepted as one forest unit. a) Gridcell corner contact, b) 500 m gap allowed, c) 1,000 m gap allowed, x) shared side required.



Appendix 2. Sensitivity analysis of meta-analysis of 71 studies.

Forest definition[a]	Average zonal forest area (km^2)	r [b]	Lower 95% limit	Upper 95% limit
50a	48 401	0.631	0.565	0.689
50b	67 863	0.626	0.560	0.685
50c	68 667	0.652	0.589	0.707
50x	44 952	0.641	0.576	0.697
30	86 684	0.611	0.543	0.671
70	7074	0.691	0.633	0.740

[a] Numbers refer to minimum percentage canopy cover required for a cell to be defined as forest (30, 50, 70). Suffixes a, b, c, x are variations in contiguity required for delimitation of a forest unit (cf. Appendix 1). [b] Averages and confidence limits were retransformed from z to r-values following analysis.

Appendix 3. Table of transects included in analyses. References are abbreviated as first author, for full reference see Appendix 4.

Study transect	Taxon	Climate	No. sites	Total forest area (#cells)	Survey grain size (km^2)	Type of survey	Effort	Comments
Able 1976 1	Birds	Temperate	7	3292833	3	Random walks	2 d	
Able 1976 2	Birds	Temperate	8	3292833	3	Random walks	2 d	
Able 1976 3	Birds	Temperate	9	3292833	3	Random walks	2 d	
Able 1976 4	Birds	Temperate	7	3292833	3	Random walks	2 d	
Bruhl 1999	Ants	Tropical	10	2237448	0.01	Litter samples	Samples sifted	Non-exhaustive but fully standardised
Dolezal 2002	Plants	Temperate	4	535751	0.005	Several small plots	All species identified	16 sites (40 m intervals) lumped to 4 (160 m intervals) by authors to reduce autocorrelation
Doran 2003	Plants	Temperate	9	238794	0.001	Plot	All species identified	Only longest of several rather short gradients used
Feistner 1999	Lemurs	Tropical	5	35290	0.5	Transects	Standardised observations	Assume all species found
Fisher 1999 1	Ants	Tropical	4	35290	0.1	Transect, both traps and litter samples		2 additional (shorter) gradients not included
Fisher 1999 2	Ants	Tropical	4	195664	0.1	Transect, both traps and litter samples	100 samples per site	Two sites at 1200 m averaged by authors
Goodman 1995	Birds	Tropical	4	1532	2	Complimentary methods	Several intense surveys	Assume all species found
Goodman 1999	Rodents	Tropical	5	35290	0.5	Traplines	Standardised trap lines, additional collecting	Assume all species found
Goodman 2001 1	Birds	Tropical	6	35290	2	Complimentary methods	Several intense surveys	Assume all species found. One degraded site excluded, one of two sites at 1900 m excluded
Goodman 2001 2	Mammals	Tropical	6	35290	2	Complimentary methods	Several intense surveys	Assume all species found. One degraded site excluded, one of two sites at 1900 m excluded
Gram 1997	Birds	Subtropical	4	16074	2	Point counts	10 × 4 counts	Mistnetting excluded, data also contain migrants
Hamilton 1981 1	Trees	Tropical	8	3679	2	Transects	All species identified	
Hamilton 1981 2	Shrubs	Tropical	8	3679	2	Several small plots	All species identified	
Hamilton 1981 3	Trees	Tropical	6	292	2	Transects	All species identified	
Hamilton 1981 4	Shrubs	Tropical	6	292	2	Several small plots	All species identified	

Hawkins 1999	Birds	Tropical	5	35290	2	Random walks	18–22 d	Other gradients in paper not proper transects
Heaney 2001 1	Mammals	Tropical	7	24536	0.05	20–40 traplines	Intensive	Assume all species found
Heaney 2001 2	Mammals	Tropical	6	445	0.05	20–40 traplines	Intensive	Assume all species found
Hietz 1995	Plants	Subtropical	6	1439	0.0006	Plot	All species identified	
Hosoda 1999	Beetles	Temperate	5	703030	0.005	Traplines	50 traps	
Ichijo 1982	Drosophila	Temperate	9	47409	0.005	Traps	2 × 1 week	Two lowland sites combined
Janes 1994	Birds	Temperate	6	7333493	0.1	Intensive surveys	All species identified	Sites reduced from 9 to 6 by averaging sites from same elevations (authors)
Kallimanis 2002	Mites	Temperate	4	586	0.005	Soil samples	All species identified	
Kappelle 1995 1	Plants	Tropical	12	318355	0.0004	20 × 25 m plot	All species identified	
Kappelle 1995 2	Plants	Tropical	12	318355	0.0004	20 × 25 m plot	All species identified	
Kawanishi 1975 1	Drosophila	Temperate	5	703030	0.1	Traps?	1 week?	
Kawanishi 1975 2	Plants	Temperate	5	703030	0.1	Small plots?	All species identified	Averaged values
Kessler 2000a 1	Acanthaceae plants	Tropical	11	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2000a 2	Araceae plants	Tropical	11	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2000a 3	Bromeliaceae plants	Tropical	11	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2000a 4	Cactaceae plants	Tropical	11	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2000a 5	Melastomataceae plants	Tropical	11	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2000a 6	Ferns	Tropical	11	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2000b 1	Bryophytes	Tropical	15	23029452	0.0004	4 trees censused	All species identified	Other studies in paper excluded (compiled data)
Kessler 2000b 2	Hepatics	Tropical	15	23029452	0.0004	4 trees censused	All species identified	
Kessler 2000b 3	Lichens	Tropical	15	23029452	0.0004	4 trees censused	All species identified	
Kessler 2001 1	Acanthaceae plants	Tropical	20	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2001 2	Araceae plants	Tropical	20	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2001 3	Bromeliaceae plants	Tropical	20	23029452	0.0004	Plot	All species identified	Averaged values

Kessler 2001 4	Melastomataceae plants	Tropical	20	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2001 5	Palms	Tropical	20	23029452	0.0004	Plot	All species identified	Averaged values
Kessler 2001 6	Ferns	Tropical	20	23029452	0.0004	Plot	All species identified	Averaged values
Kitayama 1992 1	Trees	Tropical	14	2237448	0.001	Plot	All species identified	
Kitayama 1992 2	Trees	Tropical	9	2123	0.0004	Plot	All species identified	
Lamoncha 1998	Mites	Temperate	4	3292833	0.001	Soil samples	9 samples	Two sites at 800 m averaged by authors
Lieberman 1996	Plants	Tropical	11	318355	0.01	Plot	All species identified	One much larger site excluded
McCain 2004	Mammals	Tropical	5	318355	0.5	Traps	130 traps 7 nights	Non-standardised databelow 700 m not included
Migliorini 1999	Mites	Temperate	5	1278	0.005	Soil samples	4 samples	1 non-forest site removed
Navarro 1992	Birds	Tropical	11	21038	3	Random walks + mistnet	Intensive	Assume all species found.
Nor 2001	Mammals	Tropical	6	2237448	0.05	Traplines	30 traps 4 nights	
Nussbaum 1999	Herptiles	Tropical	5	35290	0.5	Traplines	Intensive w. additional collecting	Assume all species found.
Patterson 1989	Mammals	Tropical	7	490647	0.05	Traps	55 traps 6 nights	
Pyrcz 2002	Butterflies	Tropical	8	8946	0.2	Small sites surveyed	13 × 5 min collecting	
Rakotomalaza 1999	Plants	Tropical	5	35290	0.01	Plot	All species identified	
Romdal unpubl.	Birds	Tropical	9	719	0.2	Plot	All species identified	
Sabo 1980	Birds	Temperate	5	3292833	0.05	Plot	All species identified	
Samson 1997	Ants	Tropical	6	445	0.05	20 traps	2 d	
Sanchez 2001 1	Rodents	Tropical	4	45531	0.5	4 traplines	1000 trap nights	1 non-forest site removed
Sanchez 2001 2	Bats	Tropical	4	45531	0.5	4 traplines	1000 trap nights	1 non-forest site removed
Sanchez 2001 3	Rodents	Tropical	7	45531	0.5	4 traplines	1000 trap nights	
Sanchez 2001 4	Bats	Tropical	7	45531	0.5	4 traplines	1000 trap nights	
Tattersfield 2001	Snails	Tropical	4	4681	0.1	4 plots	Intensive search + soil samples	Averaged values
Terborgh 1977	Birds	Tropical	12	23029452	5	Complimentary methods	Several intense surveys	Assume all species found.
Vazquez 1998	Plants	Subtropical	11	782	0.001	Plot/subplots	All species identified in subplots	
Whittaker 1960	Plants	Temperate	6	7333493	0.5	40–60 subplots	All species identified in subplots	

Whittaker 1975	Plants	Temperate	5	217	0.001	Plot	All species identified	Non-forest sites removed and some sites combined by averaging samples from same elevations
Yu 1994	Mammals	Subtropical	6	76617	0.1	Traplines	7 d	

Appendix 4. Full references for studies included in meta-analysis.

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